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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/599,475

09/29/2006

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1025-P04207US0/SHE

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110 7590 11/29/2011
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1601 MARKET STREET
SUITE 2400
PHILADELPHIA, PA 19103-2307

EXAMINER

STIMPert, PHILIP EARL

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

11/29/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/599,475 | Applicant(s) CALDWELL ET AL. | |
| | Examiner PHILIP STIMPERT | Art Unit 3746 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-20 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-20 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 14 July 2011 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The disclosure is objected to because of the following informalities: the abstract includes legal language as set forth above, such as, for instance "commutating means".

Appropriate correction is required.

Claim Objections

3. Claims 1-10 are objected to because of the following informalities: claim 1 redundantly recites "alternately connects the working chamber alternately". Appropriate correction is required.

4. Claims 11-20 are objected to because of the following informalities: claims 11, 12, and 14 appear to omit a descriptor such as "corresponding" or "associated" in instances of "the working chamber." Appropriate correction or clarification is required.

5. Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The subject matter of claim 14 appears to have been substantially included into its parent claim 11 by the latest amendment.

Drawings

6. The drawings were received on 14 July 2011. These drawings, and the material added to the specification discussing them, are acceptable.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-10, 12-14 and 16-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Regarding claim 1, the claim recites in its last line "the respective commutator valve." Given that only a single commutator valve is recited by the claim, the meaning of "respective" is unclear. The examiner will disregard the word "respective" for the purposes of this office action.

10. Further regarding claim 1, the claim initially recites "variable volume working chambers," but later recites "the working chamber" in both lines 3 and 6. It is unclear which working chamber of the recited plurality is referred to by lines 3 and 6. Claims 4,

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5, 8, 9 and 10 have similar recitations of "the (working) chamber" and are indefinite for the same reason.

11. Further regarding claim 1, on its face, the claim appears to recite a single flow path and a single valve member for the multiple working chambers. This causes ambiguity in the scope of the claim, as the invention as understood by the examiner involves substantially as many fluid paths and valve members as there are working chambers. The examiner is interpreting claim 1 according to his understanding of the invention, to the effect that claim 1 is interpreted to require "a plurality of flow paths, each of which connects a respective one of the variable volume working chambers to the commutator valve, and a plurality of valve members, wherein each of the valve members is disposed in one of the flow paths between the commutator valve and the working chamber corresponding to the one flow path."

12. Regarding claims 2-4, each claim recites "the valve member". It is unclear which of the implied plurality of valve members is referred to by this recitation. The examiner is interpreting claim 2 as requiring that "each valve member is electronically controlled." Claim 3 is being interpreted as requiring "a controller for controlling the valve members". Claim 4 is being interpreted as requiring that "the controller is arranged to choose whether to actuate one of the valve members, each time the corresponding working chamber is at its minimum volume, such that the one valve is closed..."

13. Further regarding claims 12 and 13, these claims refer in several places to "the valve." It is unclear which of the plurality of valves recited by claim 11 is referred to thereby, which renders each claim indefinite.

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14. Further regarding claim 14, the claim positively recites "a plurality of valves," which was previously recited in claim 11. It is therefore unclear whether the claim refers back to the previous valves or to a newly recited set of valves.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 1-4 and 8-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 3,696,710 to Ortelli (Ortelli hereinafter) in view of EP 1,319,836 to Caterpillar Inc. (Caterpillar).

17. Regarding claim 1, Ortelli teaches a fluid working machine with a commutator valve (3) and variable volume working chambers (not labeled, see Fig. 2 and col. 3, ln. 48-49) which are each connected by a flow path (19) to the commutator valve (3) and alternately connected thereby to high and low pressure manifolds (10, 11, which is which depends on configuration of the machine, see col. 2, ln. 59-65). Ortelli does not teach a valve member in each flow path (19) operable to selectively isolate the associated working chamber. Caterpillar teaches a hydraulic motor/pump system (see Fig. 3) in which individual working chambers (48) may be selectively engaged or isolated depending on the actuation or de-actuation of a check valve (72, see col. 10, ln. 50 through col. 11, ln. 7 and Fig. 3) located in a fluid path between the high or low pressure manifold and the working chamber (48). Caterpillar teaches that this allows

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the displacement of the fluid pump to be incrementally controlled (see col. 10, ln. 39-41). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a check valve as taught by Caterpillar in the flow path (19) of Ortelli, in order to allow the displacement of the machine of Ortelli to be incrementally controlled. Thus provided, there would be a plurality of valve members, each of which would be disposed in a respective fluid passage (19) between a working chamber and the commutator valve (3), operable to selectively isolate the respective working chamber.

18. Regarding claim 2, Caterpillar teaches that the valve (72) is electronically controlled (col. 5, ln. 18-22).

19. Regarding claim 3, Caterpillar teaches a controller (24) for controlling the valve members which receives a position signal from a position sensor (22, see col. 3, ln. 12, rotational position is equivalent to shaft phase angle, see also col. 8, ln. 42-51).

20. Regarding claim 4, Caterpillar teaches that the controller (24) is arranged to choose whether to actuate the valve member at minimum working chamber volume (i.e. TDC) such that the valve is closed before the expansion stroke if one of the chambers is to be isolated (col. 10, ln. 50-58, hydraulic locking occurs because the valves are de-energized, which leads to the pressure in the suction line forcing them to close and not to admit fluid into the working chambers 48).

21. Regarding claim 8, Ortelli teaches that the machine is arranged to work as a motor (see abstract). Further, Caterpillar teaches that the controller (24) can choose to

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close the valve member (72) of a particular pressure chamber partway through the expansion stroke thereof (col. 10, ln. 39-49).

22. Regarding claim 9, Caterpillar teaches that the hydraulic motors are well known in the art to be capable of being operated as pumps (see col. 1, ln. 13-14). Those of ordinary skill in the art are aware that all that is required is to apply torque to the shaft and the machine will produce a high pressure fluid flow at its high pressure port. Further, Caterpillar teaches that the controller (24) can choose to close the valve member (72) of a particular pressure chamber partway through the expansion stroke thereof (col. 10, ln. 39-49).

23. Regarding claim 10, as discussed with respect to claims 8 and 9, Caterpillar teaches that the controller is operable to close the valve member (72) of a particular pressure chamber partway through the expansion stroke thereof (col. 10, ln. 39-49). This reads on the limitation of “just before the chamber reaches maximum volume” and the depressurization and energy loss reduction will inherently follow.

24. Regarding claim 11, Ortellì teaches a fluid working machine with a plurality of variable volume working chambers (not labeled, see Fig. 2 and col. 3, ln. 48-49) which are each connected by a respective flow path (19) to a fluid controller (3) and alternately and successively connected thereby to first and second fluid manifolds (10, 11). Ortellì does not teach a valve member in each flow path (19) operable to selectively isolate the associated working chamber. Caterpillar teaches a hydraulic motor/pump system (see Fig. 3) in which individual working chambers (48) may be selectively engaged or isolated depending on the actuation or de-actuation of a check valve (72, see col. 10, ln.

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50 through col. 11, ln. 7 and Fig. 3) located in a fluid path between the high or low pressure manifold and the working chamber (48). Caterpillar teaches that this allows the displacement of the fluid pump to be incrementally controlled (see col. 10, ln. 39-41). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a check valve as taught by Caterpillar in the flow path (19) of Ortelli, in order to allow the displacement of the machine of Ortelli to be incrementally controlled. Thus provided, there would be a plurality of valve members, each of which would be disposed in a respective fluid passage (19) between a working chamber and the fluid controller (3), operable to selectively isolate (i.e. impede flow to) the respective working chamber.

25. Regarding claim 12, Caterpillar teaches a controller (24) operable to selectively control operation of each valve between an open position and a closed position (col. 10, ln. 39 through col. 11, ln. 7) in which fluid flow to the respective working chamber (48) is allowed or impeded respectively.

26. Regarding claims 13 and 16, Caterpillar teaches a sensor (22) operable to detect an operational characteristic of the system (speed and rotational position, see col. 3, ln. 8-19), which is provided to the controller (24) for the controller to use in controlling the valves (col. 8, ln. 48-51).

27. Regarding claim 14, as discussed above with respect to claim 11, Caterpillar teaches a plurality of valve disposed and operable as claimed.

28. Regarding claim 15, Caterpillar teaches a controller (24) operable to selectively control operation of each valve between an open position and a closed position (col. 10,

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ln. 39 through col. 11, ln. 7) in which fluid flow to the respective working chamber (48) is allowed or impeded respectively.

29. Regarding claims 17 and 18, Caterpillar teaches that the operational characteristic relates to the position of the shaft (see col. 8, ln. 45-48), which is equivalent to phase angle thereof.

30. Regarding claim 19, Ortelli and Caterpillar both teach that the working chambers operate between minimum and maximum volumes (see Fig. 2 of Ortelli, see also Caterpillar col. 4, ln. 25-39), and Caterpillar teaches that the isolative valve may be closed at approximately the minimum chamber volume (i.e. at TDC, see col. 10, ln. 50-55).

31. Regarding claim 20, Ortelli teaches that the manifolds are high and low pressure manifolds (col. 2, ln. 53-65 and col. 3, ln. 20-26), and that the fluid controller (3) is a commutator valve in the form of a rotatable port plate (see Fig. 1).

32. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ortelli in view of Caterpillar as applied to claim 4 above, and further in view of US Patent 5,259,738 to Salter et al. (Salter).

33. Regarding claim 5, the combination of Ortelli and Caterpillar teaches the machine of claim 4 from which claim 5 depends. Further, Caterpillar teaches that the flow rate of the machine may be adjusted (see for instance col. 10, ln. 39-40), but does not teach any particular control algorithms for doing so. As such, Caterpillar does not teach that the controller sums a previous flow demand and creates a displacement error. Salter

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teaches that a control system for a pump which takes cylinders out of service may be run by a controller to sum a previous flow demand relative to the output flow to create a total displacement demand and compare it with an error, and based thereon, to choose whether to activate a particular cylinder in order to minimize ongoing displacement error (col. 6, ln. 10-55). It would have been obvious to one of ordinary skill in the art to apply this method as taught by Salter to the machine of Ortelli as modified in view of Caterpillar, in order to minimize errors in a system employing the machine.

34. Regarding claim 6, Caterpillar teaches that pump flow should be matched to the amount of flow which is actually being used to do useful work (col. 13 ln. 57 through col. 14, ln. 2). Salter teaches a controller reading demand from an external signal line (col. 6, ln. 34-36) in order to regulate volumetric flow rate (col. 6, ln. 27-31) by deciding whether or isolate or activate working chambers. It would have been obvious to apply this teaching to the machine of Ortelli as modified in view of Caterpillar in order to provide regulation of volumetric flow rate, and thereby match the pump flow to the amount of flow which is performing useful work.

35. Regarding claim 7, if the system is being used to provide a regulated flow rate for the reasons given with respect to claim 6, then one of ordinary skill will appreciate that the number of active cylinders will naturally decrease as the shaft speed increases in order to maintain the flow rate, as fewer cylinders will be required to maintain the desired flow rate.

Response to Arguments

36. Applicant's arguments, see page 10, filed 14 July 2011, with respect to the drawings and the previous obviousness rejections have been fully considered and are persuasive. The objection to the drawings and art rejections of has been withdrawn.

37. However, as set forth above, new grounds of rejection are presented over the newly discovered reference to Ortelli, in view of Caterpillar and Salter.

38. The remaining arguments are moot in view of the new grounds of rejection.

Conclusion

39. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHILIP STIMPERT whose telephone number is

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(571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
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/P. S./
Examiner, Art Unit 3746
10 November 2011